IS 9024 (1978): Granulated Fertilizer Mixtures [FAD 7: Soil Quality and Gertilizers]

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IS : 9024 - 1978

Indian Standard

SPECIFICATION FOR GRANULATED FERTILIZER MIXTURES

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 1979

Indian Standard

SPECIFICATION FOR GRANULATED FERTILIZER MIXTURES

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(*Continued on page* 11)

AMENDMENT NO. 1 NOVEMBER 2000
TO
IS 9024 : 1978 SPECIFICATION FOR GRANULATED FERTILIZER MIXTURES

[*Page* 4, *Table* 1, *Sl No.*(ii), *col* 3]— Substitute '*1.5*' *for* '*2.0*'.

[*Page* 4, *Table* 1, *Sl No.*(ii), *col* 4] — Substitute '*1.5*' *for* '*2.0*'.

(PCD 20)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 MAY 2012
TO
IS 9024 : 1978 SPECIFICATION FOR
GRANULATED FERTILIZER MIXTURES

[*Page* 5, *clause* **3.3**(c)] — Substitute 'Gross and net quantity in kg;' *for* 'Gross and net mass in kg;'.

(FAD 7)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR GRANULATED FERTILIZER MIXTURES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 15 December 1978, after the draft finalized by the Fertilizers Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 NP and NPK fertilizer mixtures in granulated form are made in this country in increasing quantities. In order that these mixtures continue to remain in serviceable physical condition from the time they are packed to that of their use by a farmer, it is necessary to control their physical characteristics during production and to follow certain practices in their packing, handling and storage during transit and marketing. The detailed analysis of these mixtures varies in order to suit different soils and crops, and presently the State Governments have permitted specific mixtures to be manufactured and marketed. Therefore, while the analysis of individual mixtures has been left open in this standard, the provisions with regard to the manner of marking the analysis on the bags and the tolerances in the variation of the actual analysis from that marked on the bag are prescribed in this standard.

0.3 In the preparation of this standard, reference has been made to Method No. 5.120 Particle hardness of solid fertilizers, of the National Plant Food Institute, Washington, USA, and the assistance obtained is gratefully acknowledged.

0.4 In the preparation of this standard, consideration has been given to the need for maintaining co-ordination with the specifications of the Fertilizer (Control) Order, 1957 and the Essential Commodities Act, 1955 of the Government of India. However, this standard is subject to the provisions imposed under this Order wherever applicable.

0.5 For particle size, the use of IS Sieves conforming to IS : 460-1962* is prescribed. Where IS Sieves are not available, other standard sieves as judged from aperture size may be used.

*Specification for test sieves (*revised*).

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements for fertilizer mixtures in granulated form, lays down conditions to be followed in their packing, marking, handling and storage during transit and marketing, and also prescribes the permissible tolerances in the analysis of the mixtures.

1.1.1 Fertilizer mixtures in pulverized form are not covered by this standard.

2. REQUIREMENTS

2.1 Description — The material shall be in the form of free flowing granules.

2.2 Particle Size — The particle size of the material shall be such that 90 percent of the material lies between 4-mm IS Sieve and 1-mm IS Sieve, and not more than 5 percent by mass shall pass through 1-mm IS Sieve.

2.3 Resistance to Breakdown of Granules — A single granule of the material, taken from the size range 2·80 mm to 3·35 mm, shall resist a load of 1·0 kg, when tested as prescribed in **A-1.**

2.4 Free Acidity and Moisture — The material shall also comply with the requirements given in Table 1.

TABLE 1 REQUIREMENTS FOR MIXTURES

Sl No.	Characteristic	Requirement for Mixtures		Method of Test (Ref to Cl No. in Appendix A)
		Containing Superphosphate or Triple Superphosphate as an Ingredient	Not Containing Superphosphate or Triple Superphosphate as an Ingredient	
(1)	(2)	(3)	(4)	(5)
i)	Free acidity, percent by mass, *Max*	2·0 (as P_2O_5)	1·0 (as H_2SO_4)	A-2
ii)	Moisture, percent by mass, *Max*	2·0	2·0	A-3

*Rules for rounding off numerical values (*revised*).

2.5 NPK Analysis — The percent content of nitrogen, phosphorus and potassium in the material shall be in accordance with the rules and regulations prescribed by the Government and shall be marked on the bag. When the material is actually analysed according to the methods laid down in IS : 6092 (Part II)-1971*, IS : 6092 (Part III)-1971†, and IS : 6092 (Part IV)-1971‡ the actual analysis found shall not differ from the marked analysis by more than the following tolerances:

a) For percent total nitrogen content, total phosphorus (as P_2O_5) content, water soluble phosphorus (as P_2O_5) content, and water soluble potash (as K_2O) content	± 0·5 unit of the marked percent content for each of them
b) For the sum of all percent nutrient contents mentioned above	± 2·5 percent of the sum of the marked percent contents of all nutrients mentioned in (a)

3. PACKING AND MARKING

3.1 As most of the fertilizer mixtures are hygroscopic it is essential that the packing should be capable of providing adequate protection to the contents from absorption of moisture by the use of inner plastics liner. Further, the packing should be physically strong enough to withstand the normal stresses of handling in stacking, transport and storage.

3.2 It is recommended that fertilizer mixtures are packed in 50-kg packings or as agreed to between the purchaser and the supplier.

3.3 The packages shall be securely closed and marked with the following information:

a) (N-P-K) Analysis of the mixtures, N standing for total nitrogen (ammoniacal/nitrate/urea) content, P for total phosphorus (as P_2O_5) content and K for total potash (as K_2O) content. In addition, the water soluble phosphorus (as P_2O_5) content shall also be shown;

b) The words 'Granulated Fertilizer Mixtures' and specific information if superphosphate or triple superphosphate is one of the ingredients;

c) Gross and net mass in kg;

d) Name of the manufacturer and recognized trade-mark, if any; and

e) Batch number and date of manufacture.

*Methods of sampling and test for fertilizers: Part II Determination of nitrogen.
†Methods of sampling and test for fertilizers: Part III Determination of phosphorus.
‡Methods of sampling and test for fertilizers: Part IV Determination of potassium.

3.3.1 The packages may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. HANDLING AND STORAGE

4.1 Factors to be borne in view in the handling and storage of fertilizer mixtures shall be as prescribed in IS : 5985-1971*.

5. SAMPLING

5.1 The methods for drawing representative samples of the material shall be as prescribed in IS : 6092 (Part I)-1971†.

5.2 Number of Tests — Tests for all the requirements given under **2** shall be conducted on the composite test sample.

5.3 Criteria for Conformity — For declaring the conformity of the lot to the requirements of this specification, the test results on the composite test sample shall satisfy all the requirements specified in **2**.

6. TEST METHODS

6.1 Tests for the requirements shall be carried out according to methods given in Appendix A and in IS : 6092 (Part I)-1971†, IS : 6092 (Part II)-1971‡, IS : 6092 (Part III)-1971§, IS : 6092 (Part IV)-1971‖ and IS : 6092 (Part VI)-1971¶.

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*Code of practice for handling and storage of bagged fertilizers.
†Methods of sampling and test for fertilizers: Part I Sampling.
‡Methods of sampling and test for fertilizers: Part II Determination of nitrogen.
§Methods of sampling and test for fertilizers: Part III Determination of phosphorus.
‖Methods of sampling and test for fertilizers: Part IV Determination of potassium.
¶Methods of sampling and test for fertilizers: Part VI Determination of impurities.

APPENDIX A

(*Clauses* 2.3 *and* 6.1, and *Table* 1)

METHODS OF TEST FOR GRANULATED FERTILIZER MIXTURES

A-1. TEST FOR RESISTANCE TO BREAKDOWN OF GRANULES

A-1.0 General — Two alternative methods are described here. The methods are used to determine comparative hardness of granules and applicable to granulated or pelleted forms of solid fertilizers. The choice of the method shall be agreed to in the case of dispute.

A-1.1 Method A

A-1.1.1 *Apparatus*

A-1.1.1.1 *Hardness tester — See* Fig. 1.

A-1.1.2 *Procedure*

A-1.1.2.1 Collect a portion of the sample lying in the size range 2·80 mm to 3·55 mm. From the portion obtained pick out at random 25 granules.

A-1.1.2.2 Test each granule successively. Place each granule under the ratchet and slowly screw it down until the particle crushes. Note the crush point on the scale indicator and record the load-required to crush it.

A-1.1.3 *Calculation* — Calculate the mean of the 25 observations in terms of kg and report the result.

A-1.2 Method B

A-1.2.1 *Apparatus* — The apparatus, made of mild steel, is shown in Fig. 2. It consists of two parts, a frame and a plunger. The frame is made of three circular plates and three rods fitted with nut and bolt. These rods are fitted vertically on the base plate and the other two plates are fixed tightly in position one above the other. Circular holes are made at the centre in these two plates, through which the plunger rod can pass through smoothly. The plunger, of mass 150 g consists of a circular plate at the top (for keeping additional mass) and a narrow stem, of diameter 4 mm, at the base which can rest either on the base plate or on the fertilizer granule.

A-1.2.2 *Procedure*

A-1.2.2.1 Collect a portion of the sample lying in the size range 2·8 mm to 3·35 mm. From the portion obtained pick out at random 25 granules.

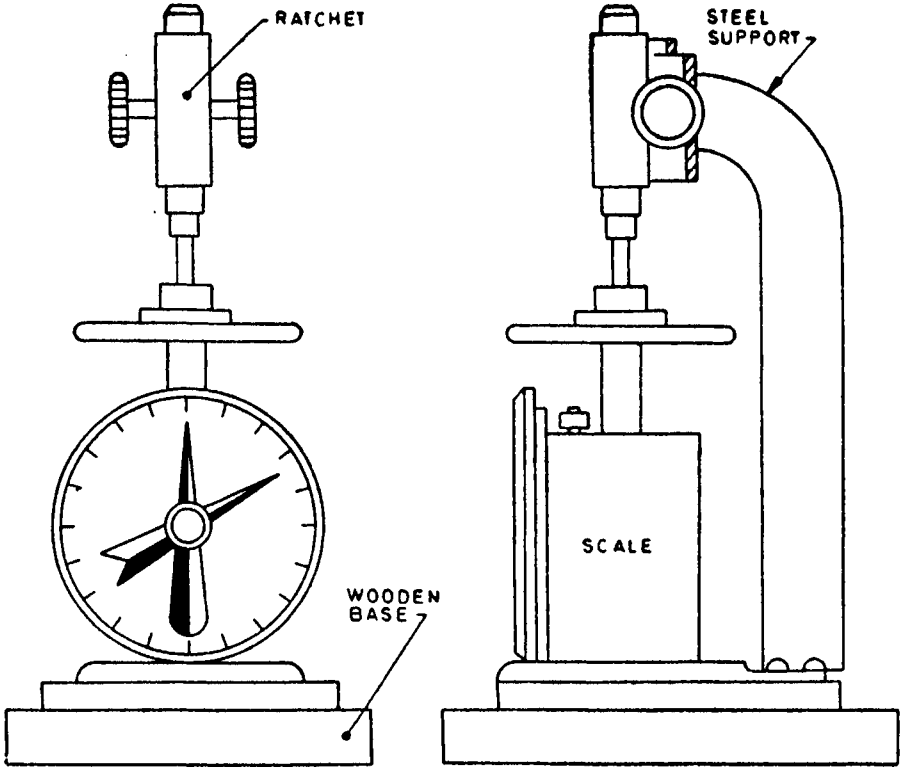
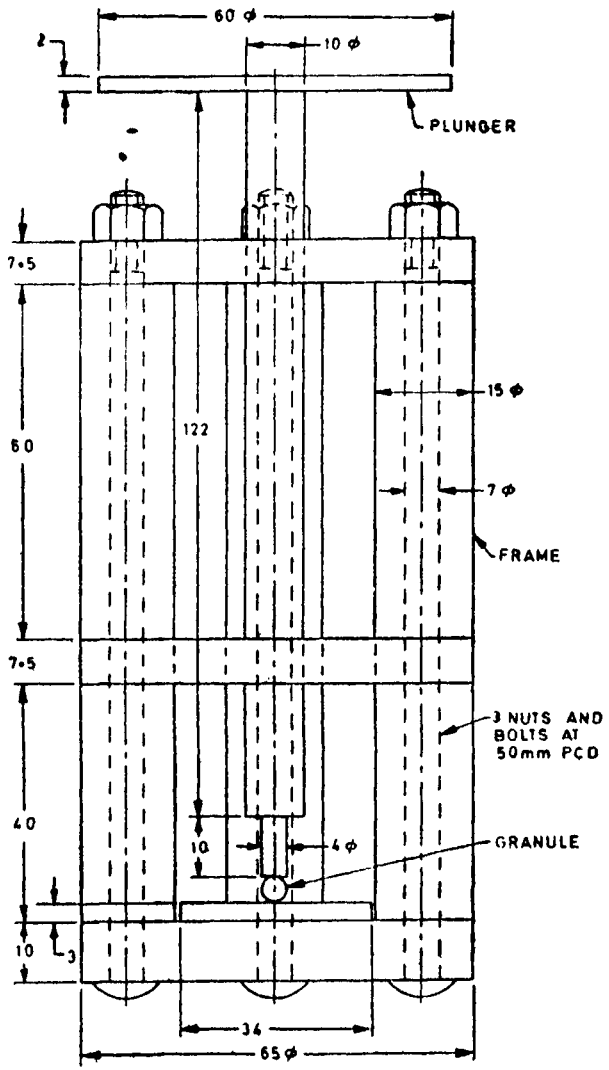


FIG. 1 HARDNESS TESTER

A-1.2.2.2 Test each granule successively. Place each granule at the centre of the base plate and keep the stem of the plunger just on its top. Put additional mass on the top of the plunger incrementally and note the total mass of the plunger itself plus the additional mass at which the granule crushes.

A-1.2.3 *Calculation* — Calculate the mean of the 25 observations in terms of kg and report the result.



All dimensions in millimetres.

FIG. 2 GRANULE HARDNESS TESTER

A-2. TEST FOR FREE ACIDITY

A-2.1 For Mixtures not Containing Superphosphate or Triple Superphosphate — Carry out the determination as prescribed under **7** of IS : 6092 (Part VI)-1971*, calculating free acidity in terms of sulphuric acid.

A-2.2 For Mixtures Containing Superphosphate or Triple Superphosphate — Carry out the determination as prescribed under **11** of IS : 6092 (Part III)-1971†.

A-3. DETERMINATION OF MOISTURE

A-3.1 Procedure — Carry out the test as prescribed in **5.3** of IS : 6092 (Part VI)-1971*.

*Methods of sampling and test for fertilizers: Part VI Determination of impurities.
†Methods of sampling and test for fertilizers: Part III Determination of phosphorus.

(*Continued from page* 2)

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INDIAN STANDARDS

ON

FERTILIZERS

IS:

294-1962 Superphosphate (*revised*)

826-1967 Ammonium sulphate, fertilizer grade

853-1964 Bone-meal, raw (*revised*)

1013-1972 Triple superphosphate (*first revision*)

1014-1956 Bone-meal, steamed

1114-1964 Ammonium chloride, fertilizer grade (*revised*)

1304-1963 Glossary of terms used in fertilizer trade and industry (*revised*)

1781-1975 Urea, technical (*first revision*)

2256-1972 Ammonium sulphate nitrate (*first revision*)

2409-1971 Calcium ammonium nitrate (*first revision*)

2764-1964 Potassium sulphate, fertilizer grade

2779-1964 Potassium chloride (muriate of potash), fertilizer grade

3029-1964 Castorseed cake for fertilizer purposes

4830-1968 Ammonium phosphate sulphate (16-20-0)

5406-1969 Urea, fertilizer grade

5407-1969 Ammonium phosphate sulphate, granular (19.5-19.5-0)

5985-1971 Code of practice for handling and storage of bagged fertilizers

6092 (Part I)-1971 Methods of sampling and test for fertilizers: Part I Sampling

6092 (Part II)-1971 Methods of sampling and test for fertilizers: Part II Determination of nitrogen

6092 (Part III)-1971 Methods of sampling and test for fertilizers: Part III Determination of phosphorus

6092 (Part IV)-1971 Methods of sampling and test for fertilizers: Part IV Determination of potassium

6092 (Part V)-1971 Methods of sampling and test for fertilizers: Part V Determination of trace elements

6092 (Part VI)-1971 Methods of sampling and test for fertilizers: Part VI Determination of impurities

6448-1971 Diammonium phosphate

6661-1972 Potassium schoenite

7131-1973 Nitrophosphate based granulated fertilizers

7863-1975 Fertilizers physical mixtures

8249-1976 Zinc sulphate, agricultural grade

8359-1977 Urea ammonium phosphate based fertilizers

8558-1977 *NEEM* cake for manuring

8559-1977 *MAHUA* cake for manuring

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Conversion
Force	newton	N	1 N = 0·101 972 kgf
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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